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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/599,571	10/02/2006	Wladimir Janssen	JANS0101PUSA	1950
22045	7590	10/01/2009		
BROOKS KUSHMAN P.C. 1000 TOWN CENTER TWENTY-SECOND FLOOR SOUTHFIELD, MI 48075				
EXAMINER				
HILTON, ALBERT				
ART UNIT		PAPER NUMBER		
4171				
MAIL DATE		DELIVERY MODE		
10/01/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/599,571

Applicant(s)

JANSSEN, WLADIMIR

Examiner

Albert Hilton

Art Unit

4171

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/02/2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)
- Paper No(s)/Mail Date 2/20/2007
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Inventor's Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This is a first action on the merits.
2. Claims 1-26 are pending.
3. This application claims priority to provisional application 60/558838, filed on 4/5/2004.

Drawings

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "54" has been used to designate both groove and vertical member, reference character "55" has been used to designate both inlet and clamp arrangement, reference character "56" has been used to designate both grooves and bolts, reference character "57" has been used to designate both sheet and O-ring. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 5 recites the limitation "target bars" in line 4. There is insufficient antecedent basis for this limitation in the claim. Target bars are recited in claim 4, but claim 5 is not dependent on claim 4. The examiner believes that claim 5 was intended to be dependent on claim 4.
7. Claim 8 recites the limitation "flowable material supply system" in line 2. There is insufficient antecedent basis for this limitation in the claim. A flowable material supply system is recited in claim 7, but claim 8 is not dependent on claim 7. The examiner believes that claim 8 was intended to be dependent on claim 7.
8. Claim 10 recites the limitation "conductive charge imparting parts" in line 2. There is insufficient antecedent basis for this limitation in the claim. The examiner believes that this was intended to refer to the "conductive surface" or claim 1.
9. Claim 11 recites the limitation "the drip proof stop of the spray action" in line 2. There is insufficient antecedent basis for this limitation in the claim.
10. Claim 12 recites the limitation "charging strip" in line 3. The examiner believes that this was intended to refer to the "conductive surface" or claim 1.
11. Claim 13 recites the limitation "the drip proof stop of the spray action" in line 2. There is insufficient antecedent basis for this limitation in the claim. The examiner believes that claim 13 was intended to be dependent on either claim 11 or 12.
12. Claim 15 recites the limitation "precise stacked metering pump" in line 2. There is insufficient antecedent basis for this limitation in the claim. The examiner believes that claim 15 was intended to be dependent on claim 14.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. Claims 1-2, 5, 7, 10, 11, 19 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by WICHMANN (US Patent No. 5209410).

15. Regarding claim 1, WICHMAN discloses an electrostatic spray system comprising members (**fingers 116**) and flow distribution modules (**nozzle 25, front member 70, rear member 90, and shim 112**) that are held in contact with each other (WICHMANN: column 6, lines 62-68 to column 7, lines 1-28, Fig. 2, and Fig. 4), in which a conductive surface (**shim 112 and fingers 116**) is part of a member, faces a flow distribution module, and is maintained at a voltage of a minimum of 20 kV (WICHMANN: column 1, lines 55-61). The flow distribution modules are supplied by a controlled flow of a flowable material (WICHMANN: column 1, lines 64-68 to column 2, lines 1-6) and can be given different dimensions, positions, and a variety of spray configurations (WICHMANN: column 10, lines 28-46).

16. Regarding claim 2, the apparatus of WICHMANN discloses flow distribution modules (**nozzle 25, front member 70, rear member 90, and shim 112**) that are positioned at two sides of a member (**fingers 116**). The flow distribution modules are positioned on the outside surface of the members (WICHMANN: Fig. 1).

17. Regarding claim 5, the electrostatic field in the apparatus of WICHMANN follows a contour that is shaped by the main vertical member (**fingers 116**) and has a similar contour in the target bars (**inductor bars 42**) (WICHMANN: column 5, lines 45-53).

18. Regarding claim 7, the electrospray apparatus of WICHMANN comprises a flowable material supply system (**distribution chambers 76** and **supply lines 123**) (WICHMANN: column 7, lines 40-50) that can operate continuously and can supply the fluid distribution modules with controlled flows (WICHMANN: column 9, lines 5-20 and column 10, lines 7-20). WICHMANN notes that an electrically conducting flowable material can be used (WICHMANN: column 10, lines 10-13), but does not specifically state that the supply system is electrically insulated. However, it is well-known in the art that the supply system of an electrospray apparatus must be kept insulated, as it would otherwise be impossible to maintain a voltage at the conductive surface if the electrically conducting flowable material was in contact with ground via the supply system. This design requirement is explicitly taught in MILLER (US Patent No. 2695002, column 4, lines 71-79). One of ordinary skill in the art would recognize that the supply system of WICHMANN is inherently electrically insulating, and therefore the apparatus of WICHMANN meets all the limitations of claim 7.

19. Regarding claim 10, the conductive charge imparting parts (**shim 112** and **fingers 116**) are thin, and are covered by flow distribution modules (**nozzle 25, front member 70, rear member 90, and shim 112**) (WICHMANN Figs. 4 and 5).

20. Regarding claim 11, WICHMANN discloses that the mechanism for directing flow of material to the flow distribution modules (**nozzle 25, front member 70, rear member**

90, and **shim 112**) is a pneumatic pressure input (**163**) controlled by pressure transducers (**159**) and having a storage sump (**164**) (WICHMANN column 9, lines 65-68 to column 10, lines 1-6). Such a system would be capable of providing drip-proof flow by reversing the direction of the pressure of the pneumatic pressure input, which would provide reverse suction and direct excess fluid to the sump.

21. Regarding claim 19, WICHMANN discloses an electrospray system with a flowable material supply system (**material supply plenum 127**), members, and flow distribution modules (**nozzle assembly 152, 154**) can be provided with an insulating canopy for the supply system and an insulating unit for the flow distribution system that are provided with a means for heating or cooling the flowable material (WICHMANN: column 9, lines 46-60). After the flowable material, which is heated when in the distribution module and nozzle, has sprayed onto a target, it will come into contact with ambient air which is cooler than the temperature of the heated flowable material. The cooler ambient air will lower the temperature of the flowable material after it has reached its target. The apparatus of WICHMANN therefore meets the limitations of claim 19.

22. Regarding claim 24, WICHMANN does not indicate that the atomization process takes place in a vacuum. One of ordinary skill in the art would readily appreciate that the claimed apparatus of WICHMANN could operate in ambient air, and would therefore inherently incorporate a gas such as air into the atomization process.

Claim Rejections - 35 USC § 103

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

24. Claims 3, 8-9, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over WICHMANN.

25. Regarding claim 3, WICHMANN's disclosure of an electrospray apparatus notes that the apparatus can be given a variety of embodiments, including a plurality of flow distribution modules (**nozzle 25, front member 70, rear member 90, and shim 112**) that are assembled to a desired spray length, and can be configured in different dimensions (WICHMANN: column 2, lines 35-42 and column 10, lines 28-46). WICHMANN does not specifically state that the plurality of flow modules could be supplied with different flowable materials or different flow rates. However, the mere alteration of these parameters would not alter the operation of the apparatus in a patentably distinct way (See MPEP 2144.04). One of ordinary skill in the art would therefore have found it obvious that the apparatus of WICHMANN could be configured to make use of a variety of flowable materials and flow rates.

26. Regarding claims 8 and 9, WICHMANN notes that the flowable material supply system (**material supply plenum 127**), members, and flow distribution modules (**nozzle assembly 152, 154**) can be provided with an insulating canopy for the supply system and an insulating unit for the flow distribution system that are provided with a

means for heating or cooling the flowable material (WICHMANN: column 9, lines 46-60).

WICHMANN does not specifically teach that the heating/cooling means is a gas or liquid. However, one of ordinary skill in the art would recognize that a temperature-regulated gas or liquid is an obvious design choice for a means of heating or cooling an insulating canopy or unit.

27. Regarding claim 22, WICHMANN does not explicitly specify that the electrospray system is an automated system controlled by a computer system. However, broadly providing an automated means to perform a manual task is insufficient to distinguish the claim from the prior art in a patentably distinct way (See MPEP 2144.04).

28. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over WICHMANN in light of DANIEL (US Patent No. 4790155).

29. The apparatus of WICHMANN comprises a pair of target bars (**inductor bars 42**) that define an electrostatic field, and may be formed to have high or low parts to create distinctive electric fields (WICHMANN: column 5, lines 45-53 and Fig. 2).

30. WICHMANN does not disclose the use of a catch tray separate from the target bars.

31. However, WICHMANN does teach that, in a dispensing apparatus, it is useful for the application equipment to be clean and easy to maintain. The use of a catch tray (**catch-pan 16**) to contain excess material in a spraying applicator is well-known in the art, as exemplified by DANIEL (DANIEL: column 4, lines 52-58). One of ordinary skill in the art, motivated by the need to keep the dispensing apparatus clean, would have found it obvious to add the catch tray of DANIEL to the electrostatic spray apparatus of

WICHMANN, with the expected result that excess spray in the apparatus would be easily contained.

32. Claims 6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over WICHMANN in light of WICHMANN (US Patent No. 5503336, designated WICHMANN '336).

33. Regarding claim 6, WICHMANN does not disclose the use of distribution grooves parallel to the direction of the electrostatic field and distributed over the width of a flow distribution module. However, WICHMANN ('336) discloses an electrospray apparatus with distribution grooves (**channels 35-36**) that are connected to a number of smaller grooves (**channels 37-96**) that are parallel to the direction of the electric field and distributed over the width of a flow distribution module (**nozzle 1**) (WICHMANN '336: Fig. 1-3 and column 6, lines 6-14). WICHMANN '336 further teaches that the distribution of grooves allows for fluid to be directed to dispensing points, resulting in equal spraying along the length of the module (WICHMANN '336: column 2, lines 39-57).

34. One of ordinary skill in the art, motivated by the need to generate an even flow of material, would have found it obvious to add the grooves of WICHMANN '336 to the electrospray system of WICHMANN, with the expected result that the grooves would help spread the flowable material along the length of the flow distribution module.

35. Regarding claim 13, WICHMANN discloses an embodiment of an electrospray apparatus in which the inlet of the fluid distribution module (**material supply line 67**) is below the feed line of the dispensing edge (**73**) of the nozzle (**55**), and fluid is dispensed upward against gravity (WICHMANN: Fig. 3 and column 5, lines 54-68 to column 6,

lines 1-5). In such an embodiment, the drip-proof stop would inherently be facilitated by the force of gravity. The addition of the grooves parallel to the electric field as disclosed in WICHMANN '336 to the apparatus of WICHMANN would therefore meet all the limitations of claim 13.

36. Claims 12 and 21 rejected under 35 U.S.C. 103(a) as being unpatentable over WICHMANN in light of VALASKOVIC (US Patent Application 2002/0175281).

37. As mentioned above, the apparatus of WICHMANN meets the limitation that the drip-proof stop of the spray is obtained by temporary suction of the flow distribution module.

38. However, WICHMANN does not disclose the quick removal of the high voltage from the charging strip by means of a ground switch. However, it is known in the art that the spray from an electrospray system will quickly stop when the voltage is removed from the electrospray tip. This is demonstrated in the electrospray apparatus of VALASKOVIC, where the spray from an electrospray nozzle is switched off by lowering the voltage below the threshold for electrospray (VALASKOVIC: paragraphs 2, and 12-15, Fig. 1). VALASKOVIC further teaches that the removal of the high voltage can be accompanied by applying vacuum suction to the fluid in the nozzle in order to prevent excess fluid from accumulating at the nozzle (VALASKOVIC: paragraphs 20, 29-31). It is known in the art that a ground switch is a rapid method for removing a high voltage.

39. One of ordinary skill in the art at the time the invention was made, would have been motivated by a need to precisely control the output of fluid from electrospray apparatus, would have found it obvious to add a ground switch to lower the high voltage

from the charging strip (**dispensing edge 73**), and to operate the switch in combination with temporary suction of the fluid flow to the fluid distribution module (**nozzle assembly 152, 154**) of WICHMAN, with the expected result that such a technique would improve the control of the spray. Such a combination would meet all the limitations of claims 12 and 21.

40. Claims 14, 15, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over WICHMANN in light of SHEVETS (US Patent Application 2002/0168297 A1).

41. Regarding claims 14, WICHMANN discloses the use of a pneumatic pressure input (**163**) (WICHMANN: column 10, lines 1-6), but does not disclose a pump that is a precise stacked metering pump with a precisely controlled motor to supply a number of flow distribution modules over the length of a spray assembly.

42. However, the use of precision stacked metering pumps in electrospray apparatuses is a well-known technique in the art, as shown, for example, in SHEVETS. In SHEVETS, a syringe pump (**10**) in conjunction with an elastomer membrane (**5**) supplies fluid to an electrospray tip (**16**) (SHEVETS: Fig. 3 and paragraphs 5). The fluid output of the pump of SHEVETS is a precision metering pump (SHEVETS: paragraph 35 and 88). WICHMANN notes that one of the objects of WICHMANN's invention is to dispense material to a target in a predetermined controlled and uniform rate of application (WICHMANN: column 3, lines 3-15).

43. One of ordinary skill in the art at the time of the invention would have found it obvious to use a pump of the kind disclosed in SHEVETS to provide fluid material to the

electrospray apparatus of WICHMANN, with the expected result that such an addition would enhance the control of the fluid dispensed by the apparatus. Neither WICHMANN nor SHEVETS discloses the use of stacked pumps. However, the use of a stack of several pumps would represent a mere duplication of parts that would not alter the operation of the invention in a patentably distinct way (See MPEP 2144.04).

44. Regarding claim 15, WICHMANN discloses a nozzle assembly with a plurality of flow distribution modules (**adjacent distribution chambers 76**) with outlet lines (**supply lines 67, connection holes 80**) and a feed tank (WICHMANN: Fig. 4 and column 7, lines 1-12).

45. WICHMANN does not disclose the use of valves such that individual distribution modules can be individually supplied with flowable material or disconnected from the supply by diverting flow from the outlet lines back to the feed tank (**plenum 128**). However, WICHMANN does make use of a chamber isolation arrangement (**80**) comprised of sealing members (**81**) and barriers (**84**) in order to supply selected modules with flowable material and to disconnect others from the supply (WICHMANN: column 7, lines 20-39). The use of valves instead of WICHMANN's chamber isolation arrangement to direct fluid flow is a substitution of an equivalent structure to accomplish the same purpose, and does not distinguish the instant application from the prior art in a patentably distinct way (See MPEP 2144.06).

46. Regarding claim 25, WICHMANN does not disclose the use of mechanical energy to affect the spray characteristics. However, the pump system of SHEVETS uses a piezoelectric or magnetostrictive actuator to create mechanical energy

(**compression wave**) on the tip (SHEVETS: paragraph 47-48). The use of SHEVETS's pump in the apparatus of WICHMANN would therefore meet all the limitations of claim 25.

47. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over WICHMANN in light of MILLER (US Patent No. 5516354).

48. WICHMANN does not disclose a spray system in which the area on the lips where ligament flow occurs is illuminated and a video camera is used to count the ligaments. However, the use of a camera to analyze the flow from an electrospray apparatus is known in the art, as exemplified by MILLER, which discloses an electrospray apparatus (2) with a window (42) and an optical sensor (5) for generating and image of the spray (MILLER: column 5, lines 21-30 and Fig. 2). MILLER further suggests that a CID or CCD camera would be a suitable sensor (MILLER: column 5, lines 24-26). MILLER does not specifically disclose an illumination source, but some source of illumination would have to be present inherently in order for the optical sensor to function. One of ordinary skill in the art would have found it obvious to add the CID or CCD camera taught in MILLER to the electrospray apparatus of WICHMANN, with the expected result that such an addition would allow for the spray characteristics to be monitored.

49. Claims 16-18 rejected under 35 U.S.C. 103(a) as being unpatentable over WICHMANN in light of SEAVER (US Patent No. 5326598).

50. Regarding claim 16, WICHMANN discloses an apparatus that sprays flowable material onto a belt (**conveyor 160**) (WICHMANN: column 10, lines 5-6), but does not

specify that the belt is a web material. However, the use of an electrospray apparatus to spray material onto a movable web is well-known in the art, as exemplified by SEAYER, in which an electrospray apparatus (**coating head system 10**) sprays material onto a traveling web material (**43**) (SEAYER: Fig. 8 and column 11, lines 22-25). One of ordinary skill in the art would have found it obvious that the belt disclosed in WICHMANN could refer to a belt on which a web material is transferred.

51. Regarding claim 17, WICHMANN discloses an apparatus that sprays flowable material onto a belt (**conveyor 160**) (WICHMANN: column 10, lines 5-6), but does not disclose the use of two spray assemblies or a web which is guided by rollers in an S configuration. However, the use of two spray apparatuses represents a mere duplication of parts that does not distinguish the instant application from the prior art in a patentably distinct way (See MPEP 2144.04). Furthermore, the use of rollers in an S configuration is a well-known solution in the art to the problem of transporting a traveling web of material, as exemplified by SEAYER (SEAYER, Fig. 8). One of ordinary skill in the art would therefore have found it obvious to guide the web material on rollers in an S configuration, and to provide two spray apparatuses.

52. Regarding claim 18, WICHMANN discloses an apparatus that sprays flowable material onto a belt (**conveyor 160**) (WICHMANN: column 10, lines 5-6). As noted above, the use of multiple spray assemblies and the use of rollers to guide the web material in an S configuration fails to patentably distinguish the invention from the prior art. The use of rollers in a C configuration represents a mere rearrangement of parts,

and does not distinguish the instant application from the prior art in a patentably distinct way (See MPEP 2144.04).

53. Claim 23 rejected under 35 U.S.C. 103(a) as being unpatentable over WICHMANN in light of OLBRANT (US Patent No. 3775806).

54. WICHMANN does not disclose the use of a dust removal device prior to the electrospray application of fluid material. However, it is well known in the art that it is often advantageous to remove dust from a traveling material prior to coating the material with a fluid material, as is taught in OLBRANT (OLBRANT: column 1, lines 22-36).

55. One of ordinary skill in the art would have readily appreciated that the removal of dust from a web material is a problem with well-known solutions in the art, and would have therefore found it obvious to add the dust removal apparatus of OLBRANT to the spray apparatus of WICHMANN, with the predictable result that such a combination would improve the coating process by removing dust from the web surface (See MPEP 2143).

56. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over WICHMANN in view of DANIEL and WICHMANN '336.

57. Regarding claim 26, WICHMANN discloses an electrostatic flow distribution and charging system (**nozzle 25, front member 70, rear member 90, and shim 112**) comprising an assembly of insulated non-conducting modules (WICHMANN: column 2, lines 19-34, column 6, lines 62-68 to column 7, lines 1-28, Fig. 2, and Fig. 4), a conductive surface (**shim 112**) with an electrical connection to said surface (WICHMANN:

Fig. 3-4) whereby the flowable material is electrically insulated except for said conductive surface and electrical connection (WICHMANN: column 2, lines 19-34 and column 3, lines 30-35), a means for applying an electrostatic field (**assemblies 131**, **spacers 136**, and **terminals 141**) (WICHMANN: column 6, lines 46-61), one or more target bars (**inductor bars 42**) (WICHMANN: column 5, lines 45-53). The flow of material is sprayed with a minimum loss from electrical currents through the assembly. WICHTMAN also discloses target bars (**inductor bars 42**) (WICHMANN: column 5, lines 45-53) that define the electromagnetic field, can be shaped to create different spray patterns, and are separate from any catch trays.

58. WICHMANN does not specifically disclose an apparatus with separately-controlled flow distribution modules or modules having different flowable materials that can be used in sections of the spray assembly. However, the incorporation of multiple modules and flowable materials would represent a mere duplication of parts, and would not distinguish the instant application from the prior art in a patentably distinct way.

59. WICHMANN does not disclose the use of grooves or a catch tray. However, one of ordinary skill in the art would have found it obvious to incorporate catch bar of DANIEL and grooves of WICHMANN '336 into the apparatus of WICHMANN for reasons given above (see paragraph 32). The addition of grooves to the apparatus of WICHMANN would result in an apparatus in which grooves distribute and guide the flow of material in the distribution modules (**nozzle 25**) over the electrically conductive part of said assembly (**shim 112**) substantially parallel with the electric field (WICHMANN: column 6, lines 62-68 to column 7, lines 1-28, Fig. 2, and Fig. 4). The application of the

electrostatic field provides a force to move the material being sprayed, to move the material being sprayed through said groove, and the flow through each groove would be substantially equal or independent of the specific geometry of groove, and the grooves would hydrodynamically distribute flowable material over a length of a distribution module.

60. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Albert Hilton whose telephone number is (571)-270-5519. The examiner can normally be reached on Monday through Friday, with alternate Fridays off, 8:00-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barbara Gilliam can be reached on 571-272-1330. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Albert Hilton

Application/Control Number: 10/599,571
Art Unit: 4171

Page 18

Examiner
Art Unit 4171

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Examiner, Art Unit 4171

/PATRICK NOLAN/
Supervisory Patent Examiner, Art Unit 4171